REMARKS

The Examiner is thanked for the due consideration given the application. Claims 12-20 and 22-26 are pending in the application. No new matter is believed to be added to the application by this amendment.

Rejections Under 35 USC §103(a)

Claims 12-14, 16-20 and 22-26 have been rejected under 35 USC §103(a) as being unpatentable over TAMURA et al. (*14th Annual Meeting of the IEEE*, Vol. 1, 12-13 Nov. 2001, pp.97-98) in view of KOREN et al. (U.S. Patent 5,889,898), and further in view of the applicant's disclosure (AD).

This rejection is respectfully traversed.

The present invention pertains to a modulator-integrated light source that operates over a wide temperature range. The modulator-integrated light source of the present invention is illustrated, by way of example, in Figure 2A of the application, which is reproduced below.

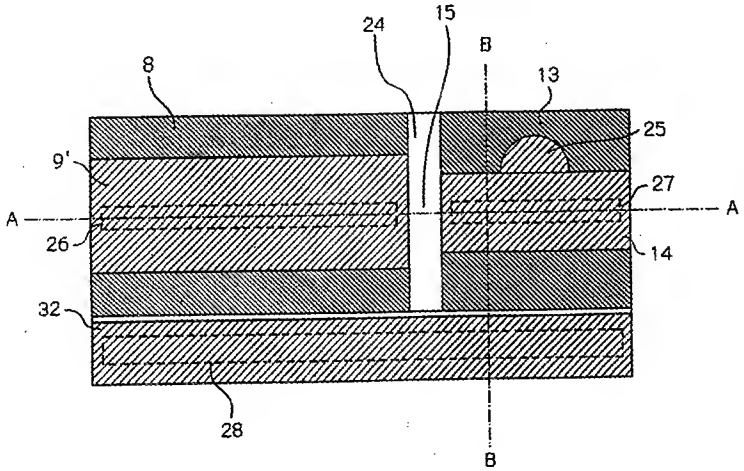


Figure 2A shows a p electrode 14, an n electrode 32 and contact windows 26 and 28. An electrode separator 15 and SiO_2 film 24 divide the p electrode 14.

In a modulator-integrated light source according to claim 12 of the present invention, as limitation conditions or requirements of a laser into which an electroabsorption optical modulator is integrated, the range of L x B and the range of a detuning amount are limited, and a high-resistance semiconductor substrate is employed. By using an external circuit which monitors the temperature to control a bias voltage which is applied to the modulator-integrated light source, this construction allows low-voltage operation in which the operating voltage is 1V or less and also allows a broader operating temperature range.

The electroabsorption of the optical modulator of the present invention satisfies the condition "*L x B ≥ 2000 μm • Gb/s where L is a length of said electroabsorption optical modulator and B is an operating frequency,*" as is set forth in claim 12 of the present invention. Claim 12 of the present invention also optimizes (that is, eliminates) temperature effects by setting the energy conversion value ΔX of a detuning amount to be "*40 meV ≤ ΔX ≤ 100 meV.*"

TAMURA et al. pertain to ultrafast electeroabsorption mondulators. The Office Action refers to page 98, column 12, second full paragraph describing Figure 5 of TAMURA et al. for

teachings to assert that this reference teaches the limitation of claims 12 and 22: "L x B ≥ 2000 μm • Gb/s, where L is a length of said electro-absorption optical modulator and B is an operating frequency." However, this relationship cannot be explicitly found in this drawing figure or passage (or any place else) in TAMURA et al.

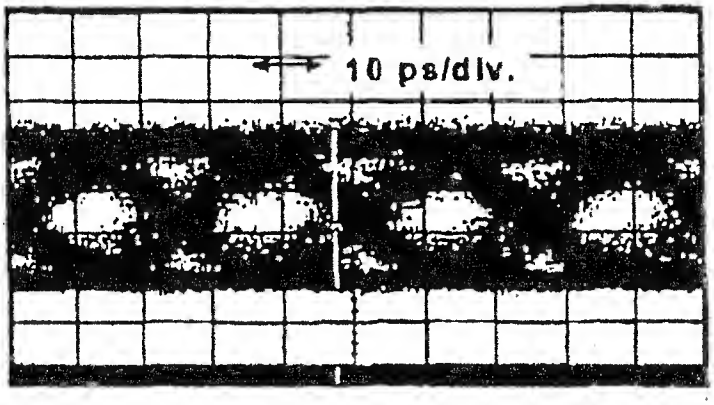


Fig. 5 40-Gbit/s eye diagram

That is, TAMURA et al. can be considered to meet a condition which L is 225 pm and B is 40 Gb/s. The condition "L x B ≥ 2000 μm • Gb/s" in claim 12 of the present invention encompasses the condition of TAMURA et al.

In addition, TAMURA et al. disclose that a high-resistance semiconductor substrate is employed to reduce capacitance.

The above construction of TAMURA et al. allows a modulation speed which is greater than or equal to 40 Gb/s.

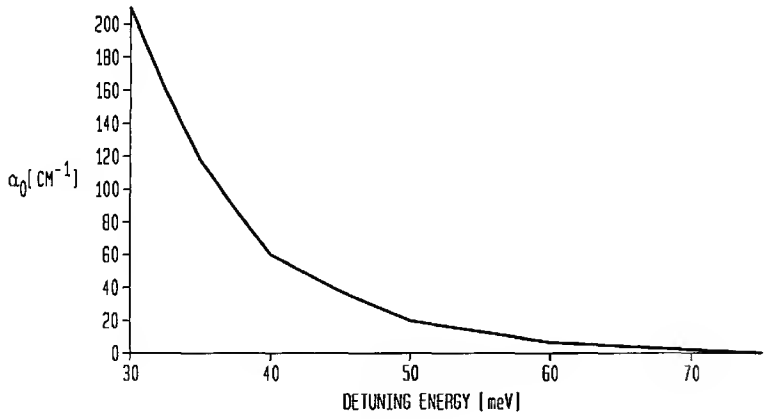
However, TAMURA et al. do not disclose an appropriate range of L x B that enables a low-voltage operation and a broader

operating temperature range.

Moreover, a person of ordinary skill in the art generally considers that it is important to increase the extinction ratio as a basic performance of a modulator. Therefore, the modulator has been usually operated at a constant operation temperature so that a detuning amount is maintained to an appropriate value.

KOREN et al. disclose only a relationship between an absorption coefficient and a detuning amount. In Figure 2 of KOREN et al., reproduced below, when the detuning amount increases, the absorption coefficient decreases.

FIG. 2

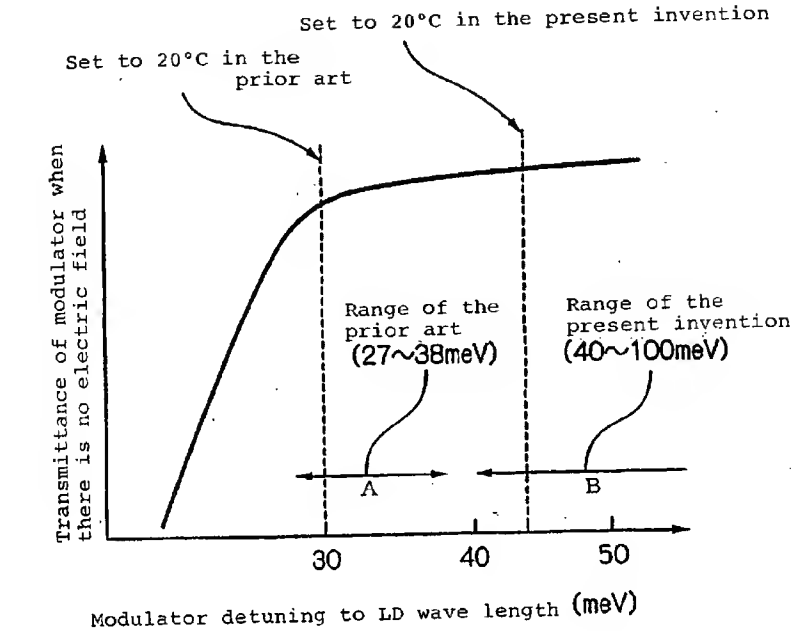


This relationship is very general. Therefore, it is difficult to set, based on the relationship, a condition 40 meV $\leq \Delta X \leq$ 100 meV as an appropriate range of a detuning amount to achieve a broader operating temperature range.

This relationship can be contrasted to that in Figure 4

of the present invention, which is reproduced below.

[Fig.4]



AD (Applicant's disclosure) discloses a method in which the offset voltage of the optical modulator is controlled according to changes in temperature. However, a characteristic, in which a detuning amount decreases as the temperature rises, has been generally known.

AD does not disclose a method that allows low-voltage operation in which the operating voltage is 1 V or less. Further, AAPA does not disclose a requirement in which it is necessary to set a range of L x B to an appropriate value to realize such a method. In addition, AD does not disclose a method that solves the problem in which when the temperature rises, the voltage increased.

As described above, TAMURA et al., KOREN et al. and AD

do not disclose any technical art of the present invention that enables, by setting the appropriate range of L x B (L x B $\geq$ 2000 μm • Gb/s) and the appropriate range of the detuning amount (40 meV to 100 meV), low-voltage operation in which the operating voltage is 1 V or less and a broader operating temperature range.

A modulator-integrated light source according to claims 12 and 13 of the present invention sets the range of the detuning amount which would not be conceivable under ordinary circumstances, and thereby obtains superior extinction in both cases when the temperature is low and when the temperature is high without interfering with the low-voltage operation.

One of ordinary skill in the art would thus fail to produce independent claim 12 or 22 of the present invention from a knowledge of TAMURA et al., KOREN et al. and AD. A *prima facie* case of unpatentability has thus not been made. Claims depending upon claim 12 are patentable for at least the above reasons.

This rejection is believed to be overcome, and withdrawal thereof is respectfully requested.

Conclusion

The Examiner is thanked for considering the Information Disclosure Statement filed August 18, 2006 and for making an initialed PTO-1449 Form of record in the application.

Prior art of record but not utilized is believed to be non-pertinent to the instant claims.

It is believed that the rejection has been overcome, obviated or rendered moot, and that no issues remain. The Examiner is accordingly respectfully requested to place the application in condition for allowance and to issue a Notice of Allowability.

The Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 25-0120 for any additional fees required under 37 C.F.R. § 1.16 or under 37 C.F.R. § 1.17.

Respectfully submitted,

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